

Claims

1. Shielding for EMI-endangered electronic components and/or circuits of electronic devices, characterized in that
 - a) an at least double-layered first printed circuit board (1) for non-EMI-endangered electronic components and/or circuits (10) is present and includes a recess (11) having a recess opening (110) and a base surface (111), on at least one side of which first printed circuit board (1) the non-EMI-endangered electronic components and/or circuits (10) are arranged,
 - b) the first printed circuit board (1) includes on the side with the recess opening (110) a first contact area (12, 14) encompassing the recess opening (110),
 - c) the first printed circuit board (1) has a first earth face (13) on a printed circuit board layer disposed between the base surface (111) of the recess (11) and the side of the printed circuit board facing away from the recess opening (110), or in the plane of the base surface (111) or in the plane of the side of the printed circuit board facing away from the recess opening (110), which first earth face (13) corresponds in area to at least the area of the base surface (111) of the recess (11),
 - d) the non-EMI-endangered electronic components and/or circuits (10) are arranged outside the recess (11) beyond the first contact area (12, 14) or the first earth face (13),
 - e) an at least double-layered second printed circuit board (2) for EMI-endangered electronic components and/or circuits (20) is present, on one side of which the EMI-endangered electronic components and/or circuits (20) are arranged,
 - f) the second printed circuit board (2) has a second earth

face (21) corresponding in area substantially to the base area of the second printed circuit board (2), on a printed circuit board layer disposed between the components side/circuits side and the side facing away from the components side/circuits side, or in the plane of the side facing away from the components side/circuits side,

g) the second printed circuit board (2) has on the components side/circuits side a second contact area (22, 23) encompassing the EMI-endangered electronic components and/or circuits (20),

h) the second printed circuit board (2) is arranged on the first printed circuit board (1) in such a way that said printed circuit boards (1, 2) are joined together by joining technology, in particular by soldering, and the EMI-endangered electronic components and/or circuits (20) on the second printed circuit board (2) disappear in the recess (11) of the first printed circuit board (1),

i) interfacial connections (14, 23) are present on both printed circuit boards (1, 2) and in the case of each printed circuit board (1, 2) are connected by one end to the respective earth face (13, 21) and lead with the other end to the respective contact area (12, 14, 22, 23), and are so arranged that the interfacial connections (14, 23), together with the recess (11) and the earth faces (13, 21), form a cage (3) in which the EMI-endangered electronic components and/or circuits (20) located in the recess (11) are shielded on all sides.

2. Shielding according to claim 1, characterized in that the interfacial connections (14, 23) are spaced apart by a distance of less than one-tenth of the wavelength λ of an electromagnetic radiation emitted by electronic components/circuits.

3. Shielding according to claim 1 or 2, characterized in that the interfacial connections (14, 23) pass through the earth faces (13, 21).
4. Shielding according to claim 1, 2, or 3, characterized in that the interfacial connections (14, 23) are filled with a filling material, preferably resin.
5. Shielding according to claim 1, characterized in that the contact areas (12, 14, 22, 23) are in each case interrupted in at least two places by gaps (120, 220), located in each case between two interfacial connections (14, 23), for first signal lines (4) for conveying signals to and from the EMI-endangered electronic components and/or circuits (20) on the second printed circuit board (2), so that the first signal lines (4) are electrically connected to second signal lines (5) outside the recess (11) on the first printed circuit board (1) when the two printed circuit boards (1, 2) have been joined together by joining technology and the EMI-endangered electronic components and/or circuits (20) are located in the recess (11).
6. Shielding according to claim 1 or 3, characterized in that the earth faces (13, 21) are configured as continuous faces or as grid faces with a grid line spacing of less than one-tenth of the wavelength λ of an electromagnetic radiation emitted by electronic components/circuits.
7. Shielding according to claim 1, characterized in that the non-EMI-endangered and EMI-endangered electronic components (10, 20) are in the form of surface mounting devices.

8. Shielding according to claim 1, characterized in that the non-EMI-endangered and EMI-endangered electronic circuits (10, 20) contain circuit modules, circuit elements and/or circuit wiring.
9. Shielding according to claim 1, characterized in that the first contact area (12, 14) includes a first shielding face (12) through which first interfacial connections (14) in the first printed circuit board (1) pass, or which is connected to the first interfacial connections (14) in the first printed circuit board (1), and in that the second contact area (22, 23) includes a second shielding face (22) through which second interfacial connections (23) in the second printed circuit board (2) pass, or which is connected to the second interfacial connections (23) in the first printed circuit board (2).
10. Shielding according to claim 1 or 9, characterized in that the printed circuit boards (1, 2) are joined together in the region of the contact areas (12, 14, 22, 23) by joining technology.